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# Durability testing of coconut shell according to ENV 807

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**Abstract**
Coconut shell was tested in the laboratory according to the European standard ENV 807 with three different soil types: compost soil, brown rot/soft rot rich soil and white rot/soft rot rich soil. Mass losses between 14 and 16 % were achieved with all three soils, indicating that the decay type is of little importance in the degradation process. Somewhat higher mass losses, 19-22 % were obtained for the durable/moderately durable, according to EN 350-2, wood species Sipo (*Entandrophragma utile*), whereas preservative-treated references had significantly lower mass losses, 0.5-7 %. The results of the test were promising but further experiments and testing will be necessary to explore the full potential for coconut shell to be used e.g. for composite materials with enhanced durability against decay fungi.

**Keywords:** coconut, shell, durability, fungal decay, ENV 807

## 1. Background

The coconut tree (*Cocos nucifera* L.) plays an important role in the tropics, particularly the coastal and island tropical regions (e.g. The Pacific region, the Philippines, Sri lanka, East Africa, Indonesian archipelago and the Caribbean Islands) as a source for timber, food and handicraft. The trunk ("timber") from non-productive plantations is a convenient by-product of an agricultural crop, as a source of alternative structural "solid wood" in local markets, but is classified as non-durable in tropical ground contact (mean stake service life: 1.4 years, Mohd Dahlan & Tam 1985). The trunk also varies between high decay susceptibility in the core to broadly moderate durability in the relatively denser outer part in laboratory decay tests (Peek 1994) or field tests (up to 2.5 years service life for the outer part). Other parts of the tree have found various industrial and ornamental uses.

Typically in many tropical regions where timber supply is not limiting, only the shell-bearing fruits are harvested while the trunks of felled trees are discarded. After consumption, the empty coconut shells are often discarded as wastes. However, in other regions particularly India and the Philippines, these shells have become a source of income from the various products that are made from this material.

The coconut inner shell is very dense (0.837 g/cm$^3$), of extremely low methanol extractives content (1.5 %) and it is known to be resistant against soft rot decay (Wong, unpublished data